

TI-29099



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE
THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of
Yu-Hung Kao

Serial No.: 09/590,613

Filed: June 8, 2000

For: Method of Generating A Compact Text-to-
Phone Pronunciation Dictionary

Art Unit: 2654

Examiner: Angela A. Armstrong

Commissioner for Patents
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Alexandria, VA 22313-1450

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UNDER 37 C.F.R. §1.8(A)

I hereby certify that the above correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. 1450, Alexandria, VA 22313-1450.

Robert L. Troike
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8/4/03
Date

REPLY BRIEF

This Reply Brief is sent in triplicate. Applicant does not request an oral hearing. Please
change any costs to Deposit Account No. 20-0668 of Texas Instrument Incorporated.

This is in reply to the Examiner's answer mailed July 17, 2003.

REPLY TO EXAMINER'S RESPONSE ARGUMENT

The first issue on appeal is whether Claims 1 and 10 under 35 U.S.C. 102 (e) are anticipated by Kanevsky et al. (U.S. Patent no. 5,835,888), hereinafter Kanevsky. The background of the invention of the specification describes what a text-to-phone dictionary is as compared to building speech recognition models. In building speech recognition models the first step is to go to the pronunciation dictionary and start with the text and look up a pronunciation

dictionary of the phones for the text. Once the phones are identified and the sequence of phones for the words is determined, HMM model for each phone is determined.

The present claimed invention relates to a pronunciation dictionary. In accordance with the claim 1 this memory space for the look up is reduced by the dictionary containing alphabetized text and corresponding phones, overlapping characters with previous entry that are prefix delta encoded; and by a rule set to convert text to phones for text not in the dictionary but fit the rule set. This combination reduces the memory space to do the lookup.

The examiner's response beginning on page 13 argues that although Kanevsky provides other features to which applicant does not implement, the word model of Kanevsky provides support for a pronunciation dictionary regardless of how the dictionary is partitioned. This assumes a partitioned pronunciation dictionary. The Kanevsky reference deals with language modeling. Language modeling is statistical and is based on the probability of a word following another word. It describes grammar in a probabilistic fashion. A pronunciation dictionary is not probabilistic at all. For each entry in a pronunciation dictionary, i.e. a word, there is one and only one sequence of phones to describe its pronunciation. Kanevsky split words into prefix/stem ending and then built the language model on these so-called "sub-vocabulary" instead of on the regular "word vocabulary". Applicant's dictionary does not depend on the creation of a smaller "sub-vocabulary". Applicant's prefix does not have to have any pronunciation significance or morphological pronunciation. It does not have to have any high frequency of use to be worthy of being put into the "vocabulary." As long as there is an overlap of spelling between neighboring entries, applicant's dictionary will take advantage of it. The Kanevsky reference does not discuss a pronunciation dictionary where for a word there is a single sequence of phones. The Kanevsky reference does not teach a prefix that does not have a

pronunciation significance or morphological significance or have to have a high frequency of appearance to be put into the vocabulary. Kanevsky does not teach any of this and is not even concerned with the size of the pronunciation dictionary itself. Kanevsky does not solve applicant's problem of reducing the size of the lookup table.

The applicant further calls for the dictionary to include a text to phone rule set for text not in the dictionary. While a rule set per se is known all prior art strived to improve the rule set so that the pronunciation will be as close to a dictionary as possible. Sometimes the rule set ended up becoming larger than a dictionary, which defeats the purpose of a rule set. The use of a rule set is not taught in Kanevsky. This element in the pronunciation dictionary further minimizes the alphabetical listing by a rule set. There is nothing in Kanevsky to suggest this. The examiner references Col. 1, lines 49-55 of Kuhn et al (U.S. Patent No. 6,230,131) hereinafter Kuhn. It states that a decision tree can also be used in a speech synthesis system to generate pronunciation for words not found in the current dictionary. Kuhn teaches a method of using a decision tree questions to generate phone from spelling. This method requires "letter only trees" and "mixed trees" which require a lot of memory to store. Kuhn has to do with pronunciation that is not in the dictionary. In the prior art a rule set strived to improve the rule so that pronunciation will be as close to a dictionary as possible. This is not to be used in addition to a dictionary. Kuhn teaches away from applicant's teaching. Applicant's invention is for a different purpose. Applicant teaches to generate "dictionary accurate pronunciation" using a much smaller memory than required by a current dictionary with full alphabetical listing by an alphabetical listing dictionary with overlapping characters with previous entry that are prefix delta encoded and by a simple rule set for those words not found in the dictionary. There is nothing in Kuhn that suggests providing a reduced size pronunciation dictionary using Kuhn's decision tree or Kuhn's

decision tree with an alphabetized text and corresponding phones and/or overlapping characters with previous entry that are prefix delta encoded. Kanevsky does not suggest a rule set to convert text to phones for text not in a pronunciation dictionary and fit the rule set. The combination of a decision tree as taught in Kuhn with Kanevsky would not result in a reduced size memory for the letter only trees and the mixed trees would require a lot of memory. The examiner states that: "Kuhn specifically teaches that implementation of the spelling-to-pronunciation decision tree allows the user to add words to the recognition dictionary without having to understand the nuances of building a phonetic transcription, and thus one of ordinary skill in the art would recognize the advantages of user-friendliness with which new words could be added to the system". This of course is false and false reasoning. As discussed previously Kuhn has to do with pronunciation that is not in the dictionary. In the prior art a rule set strived to improve the rule so that pronunciation will be as close to a dictionary as possible and not to be used in addition to a dictionary. A dictionary would defeat the purpose of a rule set. One of ordinary skill in the art would not recognize the advantages of a reduced size memory because the decision tree process would add to the overall size of the memory. One of ordinary skill in the art would not use a decision tree as taught in Kuhn with there is also alphabetized text and corresponding phones and overlapping characters with previous entry that are prefix delta encoded since that would be duplication of data since the decision tree should likely convert the text. Applicant is using a much simpler rule set for text not in the dictionary.

As stated in *In re Fritch*, 23 USPQ2d 1780 "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." There is nothing in the references to teach or suggest the combination.

Claim 10 which call for the method of making a pronunciation dictionary as claimed in claim 1 is therefore also deemed allowable over the references for at least the same reasons.

A second issue on appeal is whether Claims 2-4, 9 and 11-13 under 35 U.S.C. 103 (a) are unpatentable over Kanevsky in view of Kuhn et al. (U.S. Patent no. 6,230,131), hereinafter referred to as Kuhn, and Das (U.S. patent no. 6,148,283), hereinafter Das.

Applicant's Claim 2 further calls for the dictionary to include "an error encoded set for those entries from the rule set wherein the entry only contains the difference with the rule set predictions." This element in the pronunciation dictionary further minimizes the alphabetical listing by an error encoded set. In this case the entry only contains the difference with the rule set predictions. This is not taught in Kanevsky, Kuhn, or Das. Das teaches a multi-stage vector quantizer, which is applied on numerical data. This element in the pronunciation dictionary further minimizes the alphabetical listing by an error encoded set. There is no suggestion in Das of using this on text encoding or even pronunciation encoding. The rule set refers to the text to phone rule set in the claim. There is no suggestion of using this in a dictionary with an alphabetized text and corresponding phone with overlapping characters with previous entry that are prefix delta encoded and to use with a rule set to convert text to phones for text not in the dictionary and fit the rule set. The examiner is not relying on the teaching in the references but on applicant's own teaching in rejecting the claims. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. There is nothing in the references to teach or suggest the combination.

Claims 3 and 12 further call for the error encoded set to be prefix delta encoded. It is not seen where this is taught or suggested in any of the references. Claims 4 and 13 further call for a

delimiter character between each entry. It is not seen where this is taught or suggested in any of the references. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. There is nothing in the references to teach or suggest the combination. Claims 9 and 11 include all the limitations in Claim 2 and is deemed allowable for at least the same reasons as Claim 2

A third issue on appeal is whether Claim 5 under 35 U.S.C. 103 (a) is unpatentable over Kuhn (U.S. Patent no. 6,230,131) in view of Das (U.S. patent no. 6,148,283), hereinafter Das.

Kuhn teaches a method of using decision tree questions to generate phone from spelling. This method requires letter only trees and mixed trees which require a lot of memory to store. This is to deal with pronunciation that is not in the dictionary. Applicant's invention is for a different purpose; we want to generate "dictionary accurate pronunciation" using a much smaller memory than that required by a conventional text-to-phone dictionary. For those words not found in the dictionary, it is handled by a rule set. The Das reference teaches a multi-stage vector quantizer, which is applied on numerical data. The examiner uses the reference to show the idea of error encoding. The applicant has known of using error encoding on numerical data. However, it has not been used on text encoding, not to mention pronunciation encoding. It is therefore not seen where Das in any way teaches or suggests applicant's claimed "pronunciation dictionary" comprising "an error encoded set for those entries different from the rule set wherein the entry only contains the difference with the rule prediction." Further, there is no suggestion in Das or Kuhn to combine these references. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. There is nothing in the references to teach or suggest the combination.

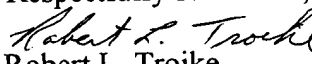
Claim 8 is dependent on Claim 5 and is therefore deemed allowable for at least the same reasons as Claim 5. Claim 8 further calls for “an alphabetized text and corresponding phones; and overlapping characters with previous entry are prefix delta encoded.” This is neither taught nor suggest in Kuhn or Das. It is not taught in Kanevsky for the reasons discussed in Issue 1. The combination is not taught or suggested in Kuhn, Das or Kanevsky. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. There is nothing in the references to teach or suggest the combination.

A fourth issue on appeal is whether Claims 6-8 under 35 U.S.C. 103 (a) are unpatentable over Kuhn (U.S. Patent no. 6,230,131) in view of Das (U.S. patent no. 6,148,283), hereinafter Das and further in view of Kanevsky et al. (U.S. Patent no. 5,835,888), hereinafter Kanevsky. These claims are deemed allowable for at least the same reasons as Claim 2.

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. There is nothing in the references to teach or suggest the combination.

CONCLUSION

For the reasons set forth above, it is clear that the Claims 1 through 13 on appeal define patentably over the cited references. Accordingly, reversal of the final rejection and allowance of the claims on appeal is urged that justice be done on the premises.

Respectfully submitted,

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